Roundabouts vs. Signals

When, Where & How to Decide What's Best

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Objectives

- Summarize differences between roundabouts and traffic signals
- Identify good locations and conditions for roundabouts
- Identify red flags conditions where roundabouts are not the best option
- Examine comparative analysis of roundabouts and signals at intersections around the State

What is the Difference?

Roundabouts

- One-way, circular intersection
- Eliminates left turns
- Reduces occurrence and severity of crashes

Design features of a roundabout include: Yield control of entering traffic; Channelized approaches that deflect traffic into one-way, counterclockwise flow; and Geometric curvature of the circular road and angles of entry to slow the speed of vehicles. These features effectively decrease driving speeds to 30 mph or less.

What is the Difference?

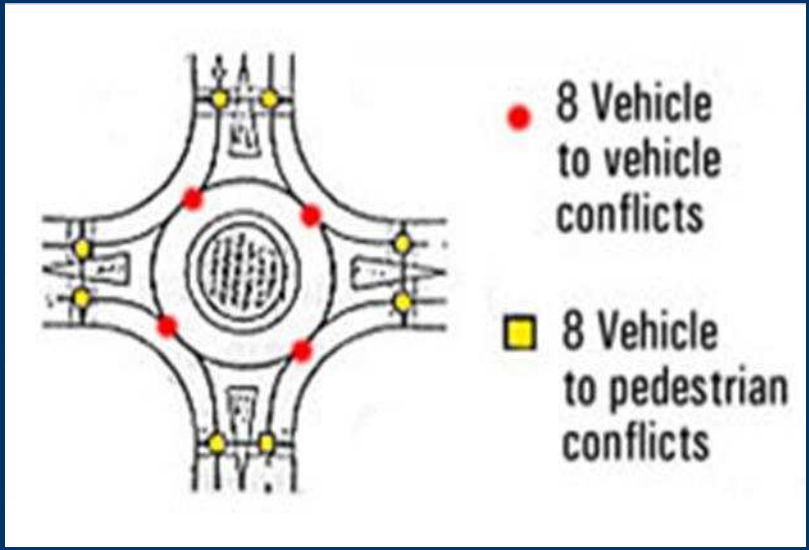
Traffic Signals

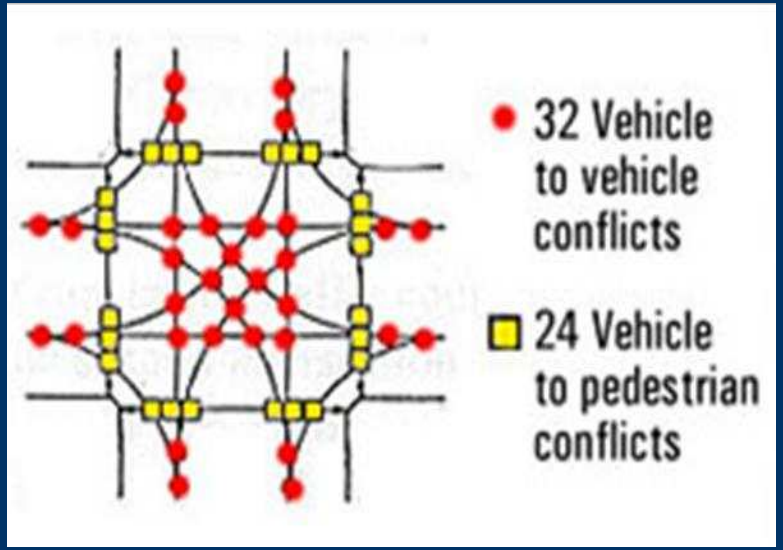
- Controls the assignment of vehicular and pedestrian right of way where potentially hazardous conflicts exist or where passive devices do not adequately control
- Timing operations can be pre-timed or traffic-actuated
- There are three basic types of traffic-actuated controllers: Semi-actuated, Fully actuated and Volume-density

What is the Difference?

In a roundabout, opposing turns will cross one another. In a conventional intersection, those same turns do not cross each other.

What is the Difference?





The frequency of crashes at an intersection is related to the number of conflict points. A conflict point is a location where the paths of two motor vehicles, bicycles or pedestrians connect. The figure shows the conflict points of a traditional four leg intersection and a roundabout.

When is a Roundabout Appropriate?

Roundabouts are considered for a variety of reasons ranging from community enhancement and traffic calming, to safety improvements and operational benefits.

A key factor in deciding if a roundabout is an appropriate intersection treatment is the traffic demand.

Maximum daily service volumes*:

- Single-lane = 20,000 to 26,000 vpd
- Dual-lane = 40,000 to 50,000 vpd

When is a Roundabout Appropriate?

After traffic demand has been determined you should also evaluate the following intersection characteristics.

Good Idea

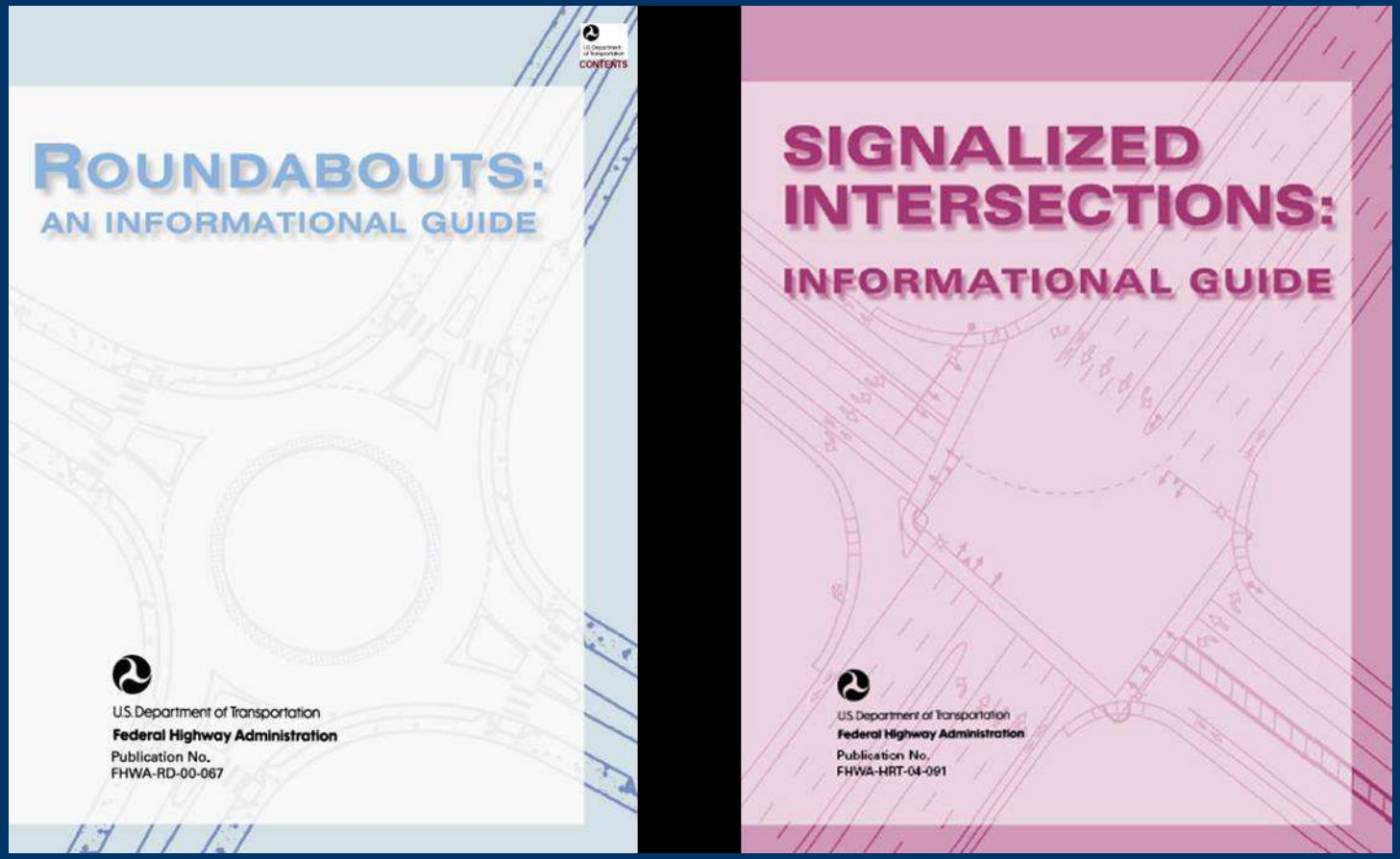
- Doesn't meet signal warrants
- Four-way stop condition
- Unusual geometry
- Changing traffic patterns
- Desire for aesthetic interest or gateway experience

Not So Good Idea

- High speed facility
- Right-of-way constraints
- Grade issues (>3% on entry, >4% around circle)
- High volume of trucks or pedestrians
- Adjacent signals nearby

When is a Roundabout Appropriate?

Resource Materials



Which Option Works Best?

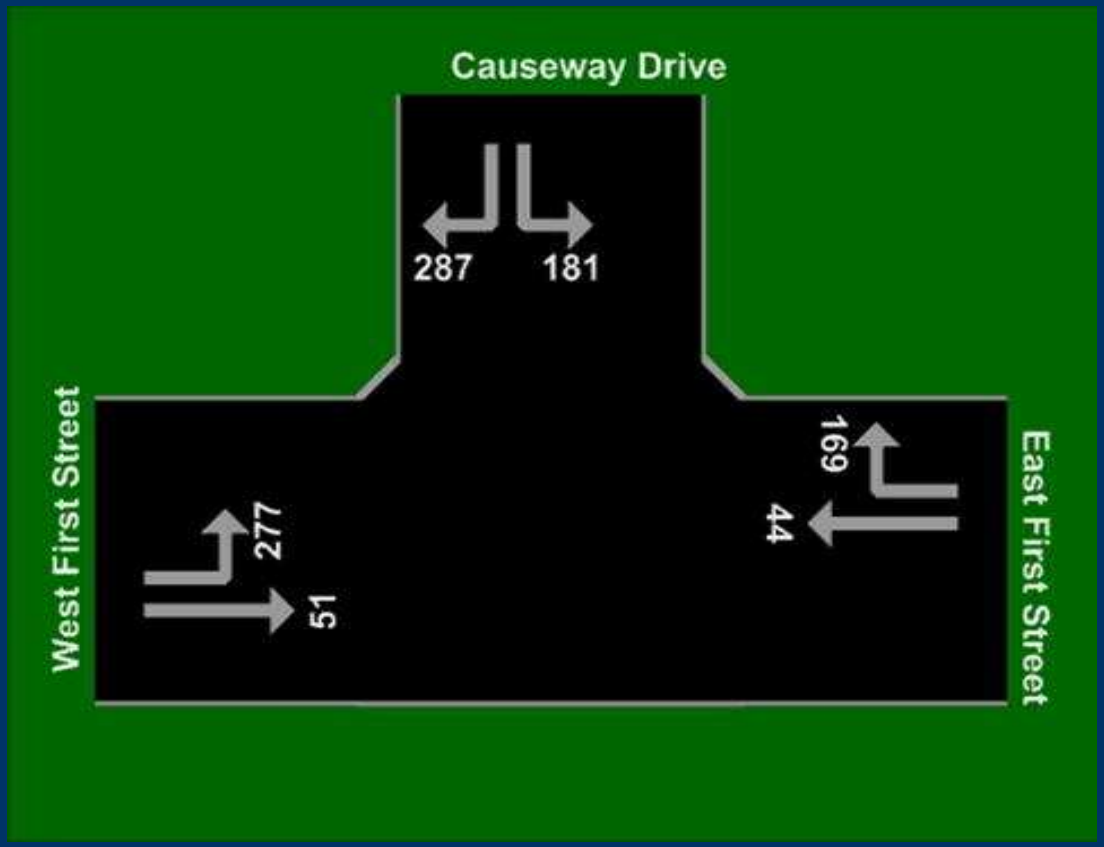
Ocean Isle Beach – NC 904 (Causeway Drive) & 1st Street

Intersection Characteristics:

- Three-legged, with perpendicular approach angles
- Right-of-way constraints (Pier, Putt-Putt park, Buildings)
- Parking adjacent to roadside
- Pedestrian activity
- High Summer tourist traffic

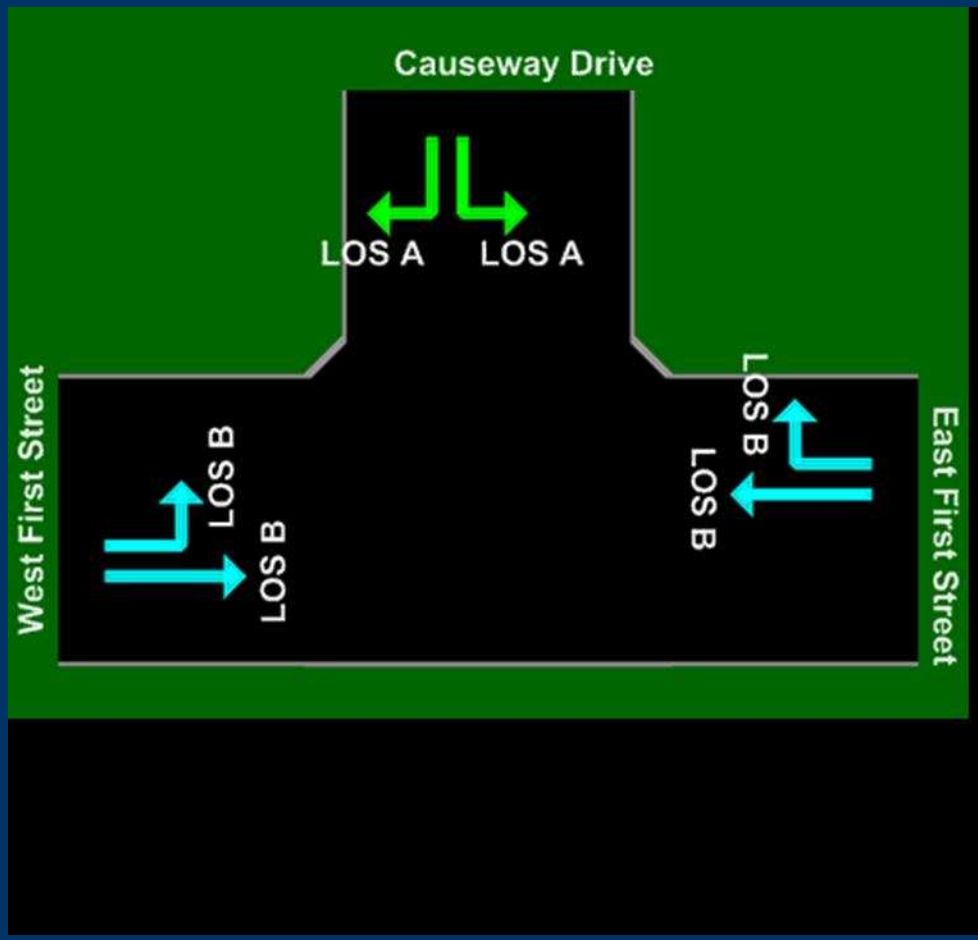

E 3rd St
W 4th St
E 2nd St
Causeway Dr SW
Halifax St
E 1st St
W 2nd St
Ocean Isle Beach
904
Clinton St
E 1st St
W 1st St
W 1st St

Peak Hour Traffic Volumes



- Volumes included a seasonal factor to account for heavier summer traffic

Level of Service



Flow Scale = 248% **Spare Capacity**

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS
West: West First Street						
12	LT	904	1079	0.838	15.1	B
		904	1079	0.838	15.1	B
East: East First Street						
22	TR	586	692	0.847*	18.8	B
		586	692	0.847	18.8	B
North: Causeway Drive						
42	LR	1290	1707	0.756	4.6	A
		1290	1707	0.756	4.6	A
ALL VEHICLES:		2780	3477	0.847	11.0	B


END
904

Which Option Works Best?

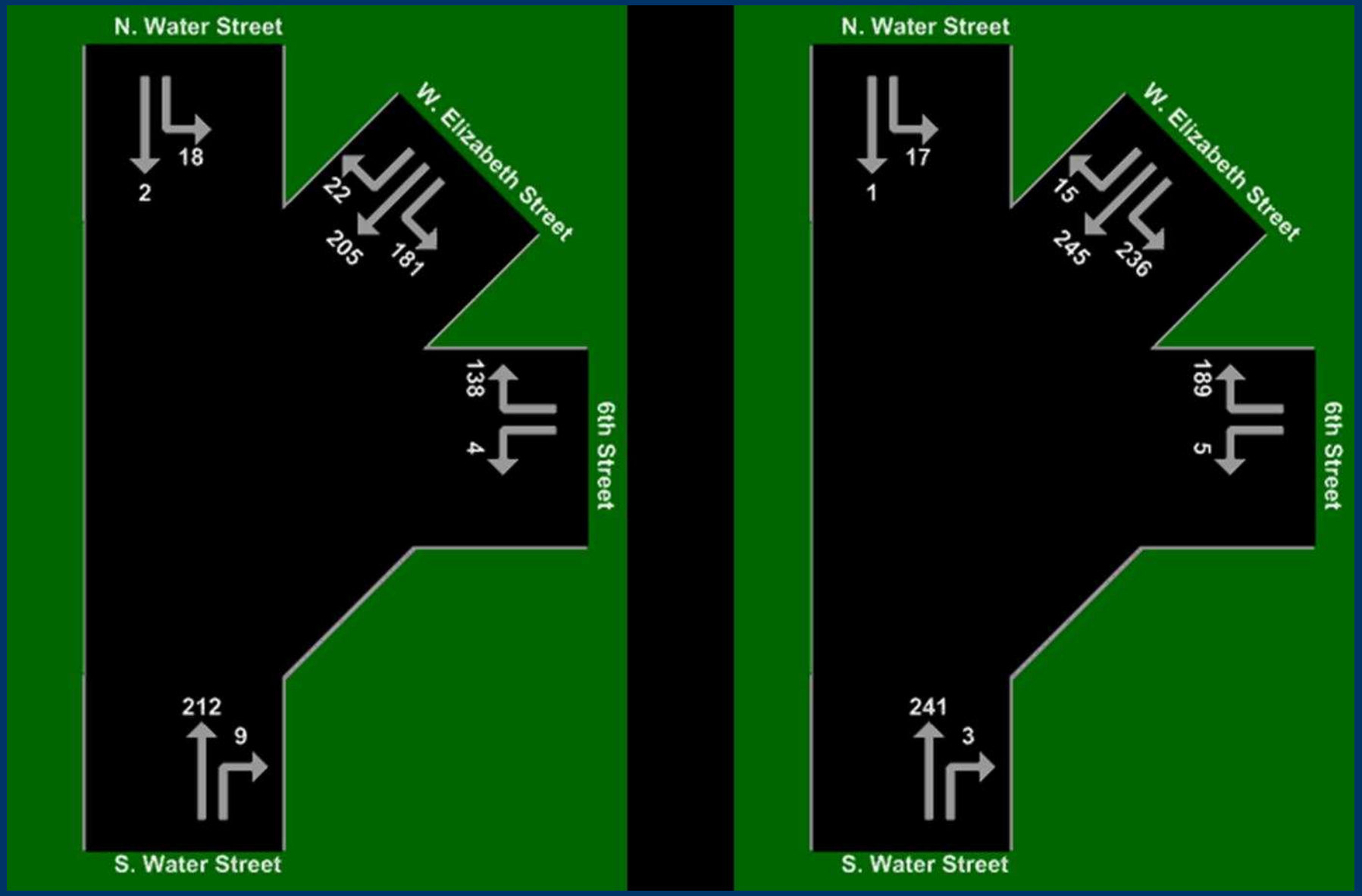
Lumberton - Water Street, Elizabeth Road, & 6th Street

Intersection characteristics:

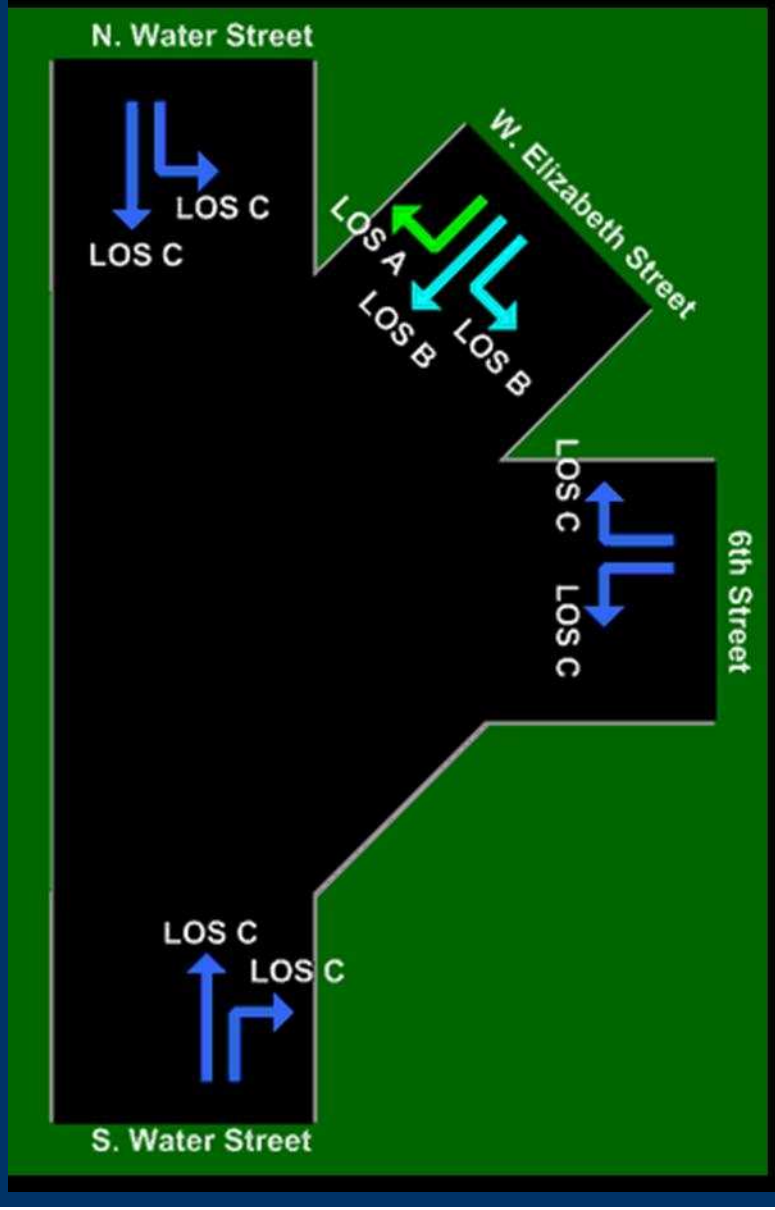
- Existing signal (Pre-timed)
- Four-legged, with awkward approach angles
- Right-of-way constraints (e.g. River, Park, Buildings)
- Adjacent signals


Water Street
Elizabethtown Road
Lumber River
6th Street
Elm Street
5th Street
5th Street

Peak Hour Traffic Volumes



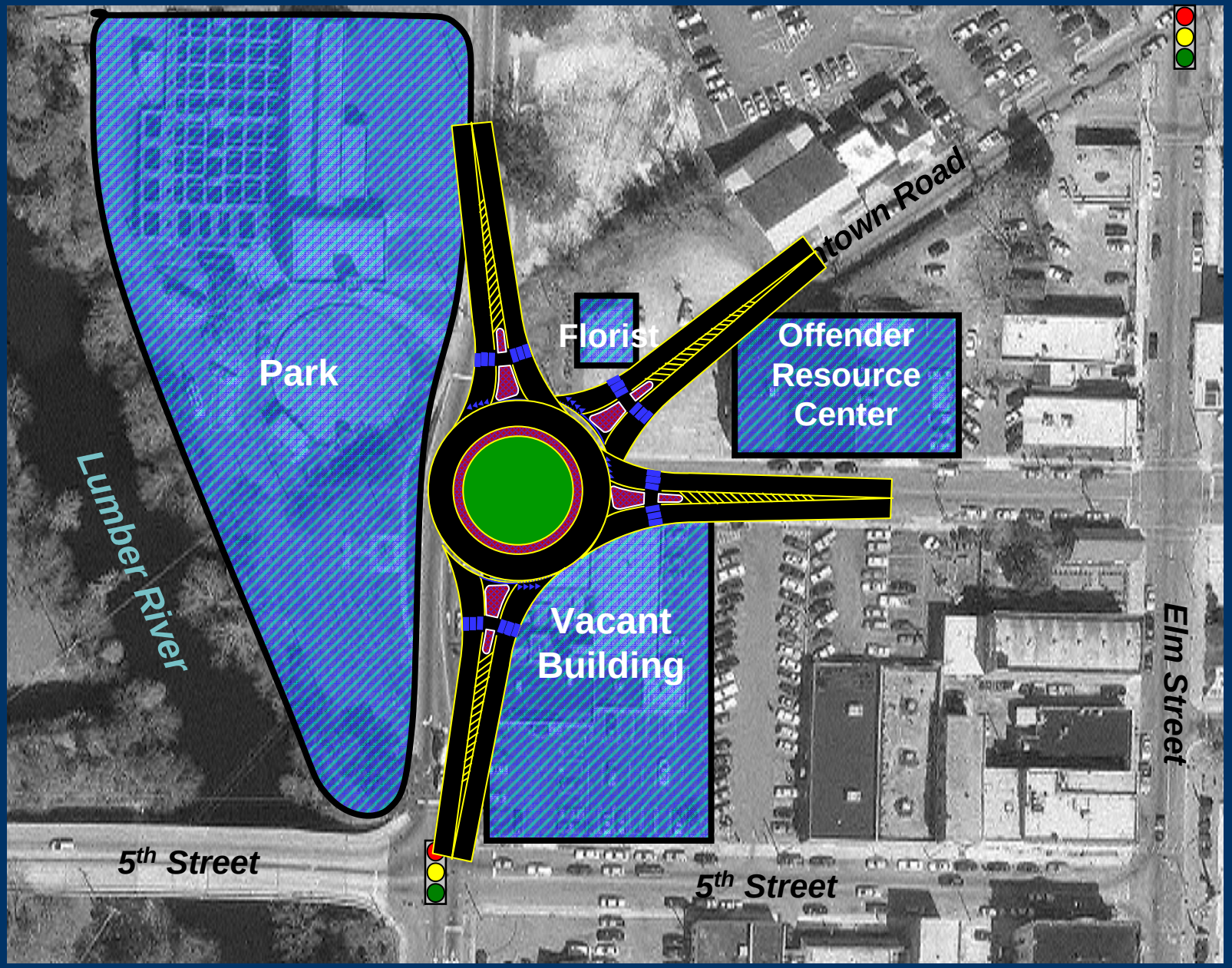
Level of Service



Flow Scale = 244% **Spare Capacity**

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS
South: S. Water Street						
32	T	653	772	0.846*	24.6	C
33	R	9	11	0.818	26.8	C
		662	783	0.846	24.6	C
East: 6th Street						
22	L	14	18	0.778	27.6	C
23	R	512	666	0.769	22.5	C
		526	684	0.778	22.6	C
NorthEast: W. Elizabeth Street						
62	LT	1304	1786	0.730	13.4	B
63	R	41	56	0.732	7.7	A
		1345	1842	0.732	13.2	B
North: N. Water Street						
42	L	46	303	0.152	30.0	C
43	T	4	26	0.154	21.1	C
		50	329	0.154	29.3	C
ALL VEHICLES:		2583	3638	0.846	18.4	B


Park
Florist
Offender Resource Center
Vacant Building
Lumber River
5th Street
5th Street
Elm Street
town Road

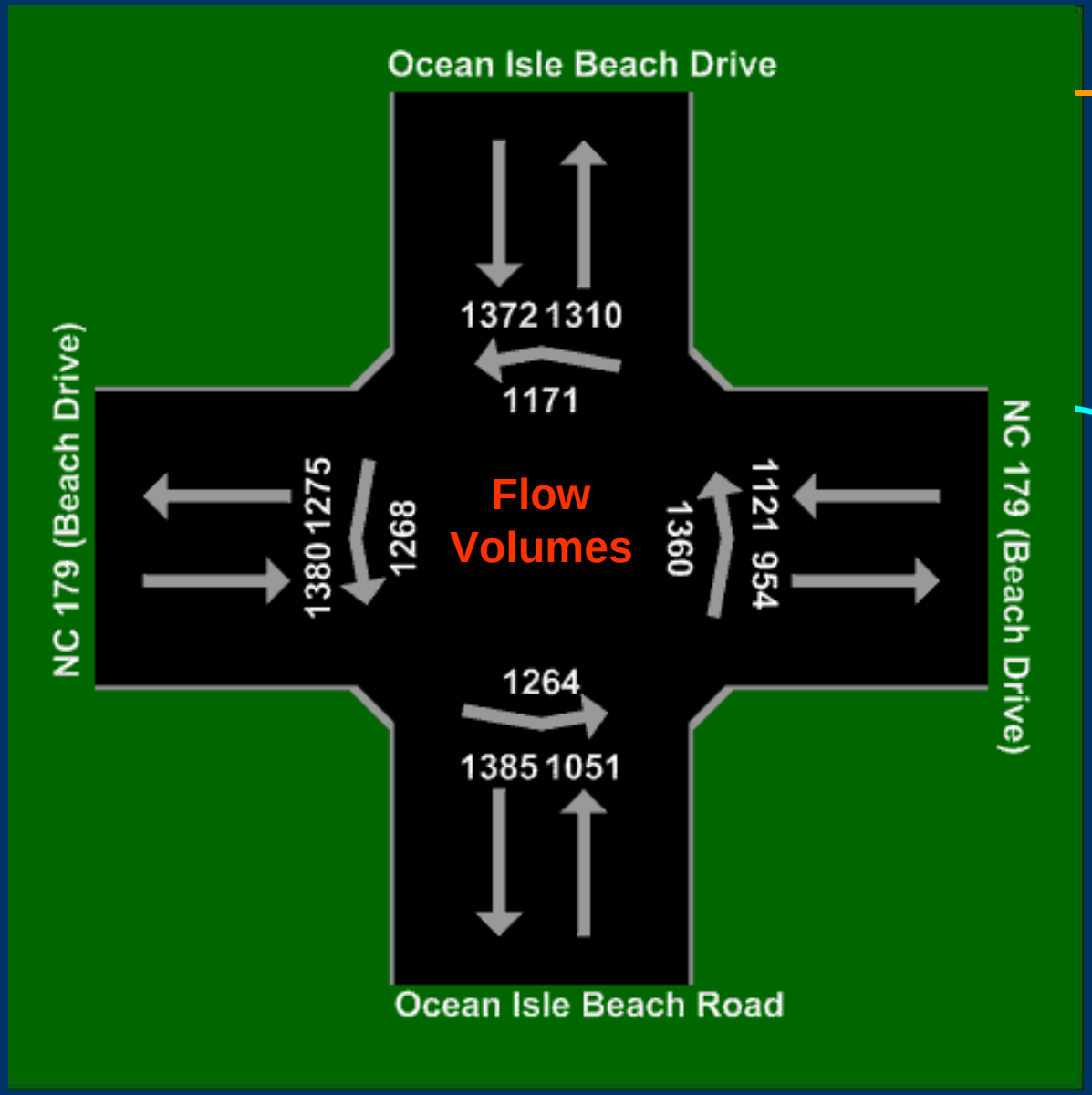
Which Option Works Best?

Ocean Isle Beach – NC 179/904 & Ocean Isle Beach Road

Intersection Characteristics:

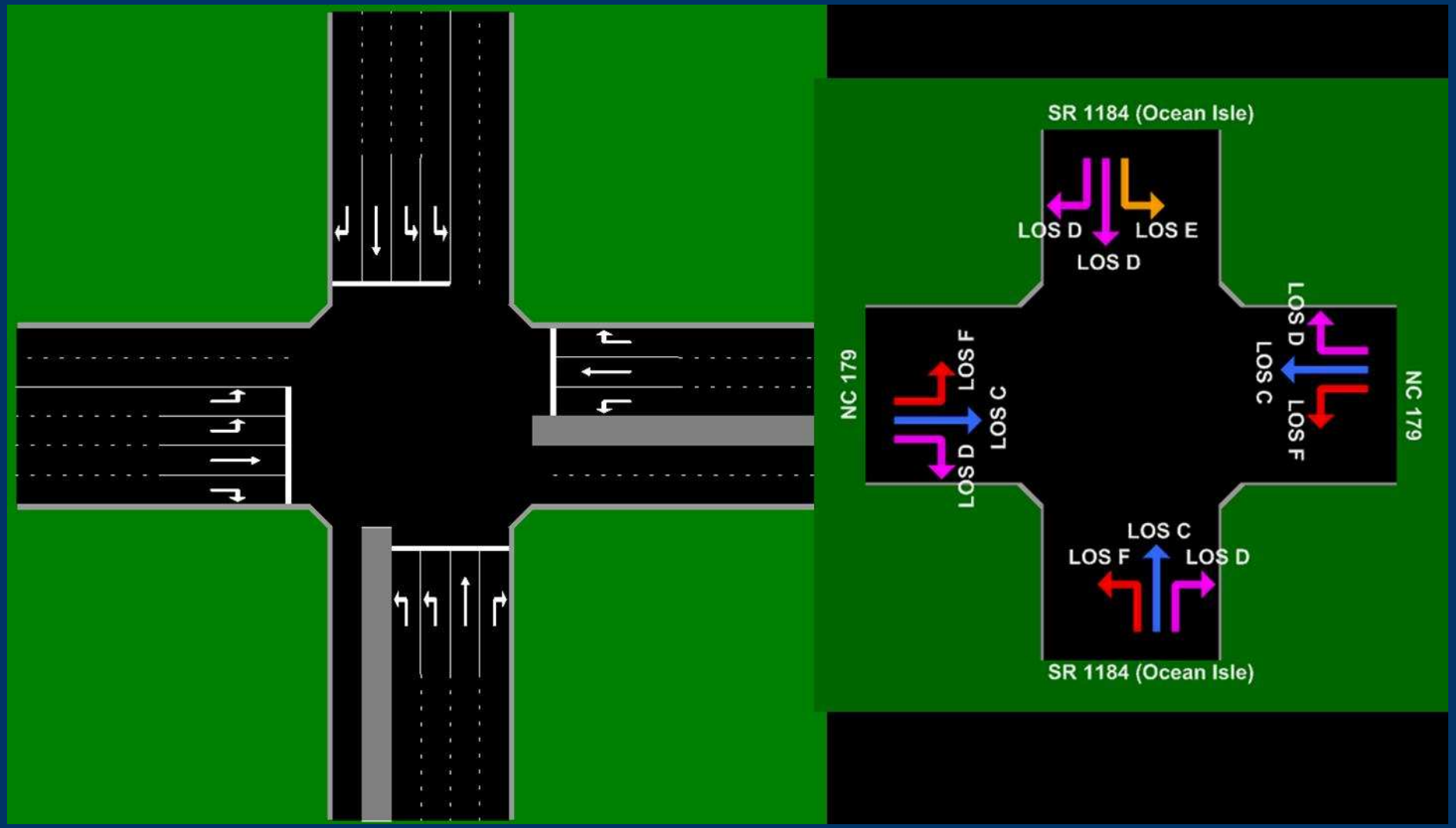
- Existing signal (Fully Actuated)
- Right-of-way constraints (Airport, Gas Station, Building)
- High Summer tourist traffic
- 45 mph posted speed limit
- Rural location

Peak Hour Traffic Volumes

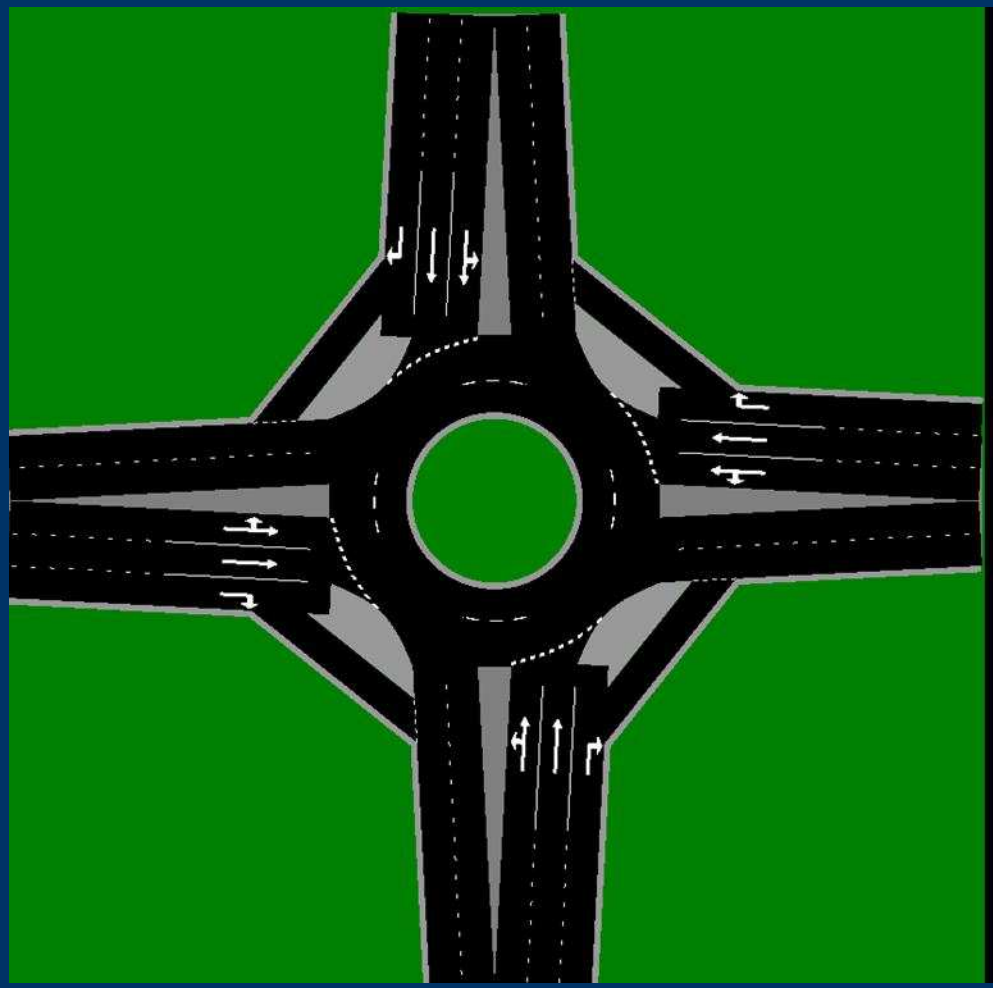


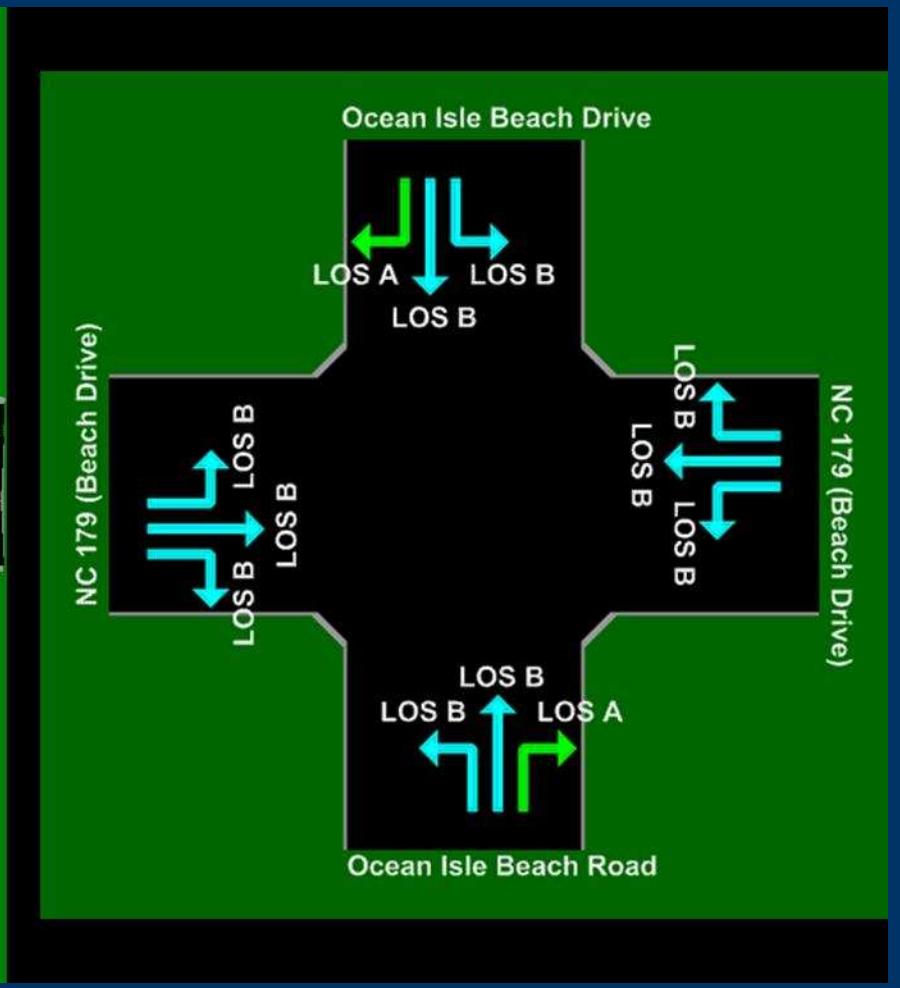
- Left turn volumes warrant dual lanes at existing traffic signal
- High right turn volumes warrant exclusive turn lanes
- Relatively balanced volumes but too HIGH for single lane roundabout

Traffic Signal Analysis



Roundabout Analysis





MOEs	Approach	Dual Lane Roundabout	Modified Traffic Signal
LOS	West	B	E
	South	B	F
	East	B	F
	North	B	D
v/c	West	0.842	1.035
	South	0.755	1.748
	East	0.722	1.286
	North	0.831	0.77
Average Delay (sec)	West	16.6	68.3
	South	15.5	207.7
	East	16.3	82.2
	North	16.6	49.4
Queue (feet)	West	228	612
	South	174	909
	East	169	875
	North	245	1014

- Both options require additional right-of-way. The roundabout will require more at the circle, but less on the approaches
- Dual lane roundabout provides a significant LOS improvement over the signal
- Roundabout also reduces approach delays and queuing by 60% to 90%


Concept Sketch Only
SR 1184 & NC 179
Brunswick County
July 10, 2008
1in = 100 feet

For more information, contact

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